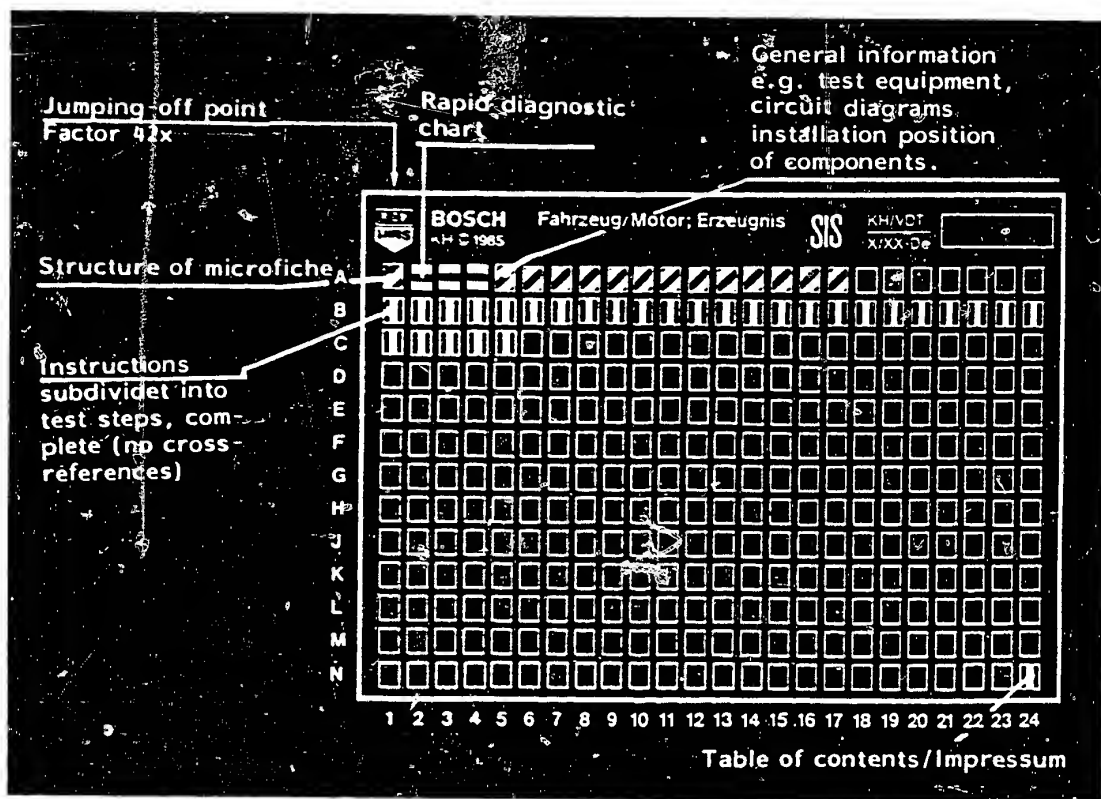


Structure of microfiche



1. Read from left to right
2. Title of microfiche (appears on each coordinate)

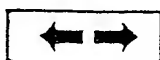
E16	Product/component/test step
	Vehicle/engine

↑ Coordinate

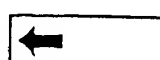
3. Limits of section



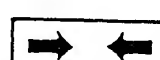
Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6

C6

A1	Trouble-shooting program	↓
-----------	--------------------------	---

1. Rapid diagnostic chart for the test adapter for the heater and air conditioner

The rapid diagnostic chart below makes it possible for the experienced technician to check the system quickly using test adapter KDHK 0001.

The contents of this chart are limited to the following information:

- Sequence of test steps
- Switch settings on the adapter
- Test instructions and test specifications (readings on the adapter)
- Cross-references to coordinates of the pertinent detailed testing and trouble-shooting program.

If detailed information and instructions are required, proceed in principle according to the trouble-shooting starting from Coordinates B 1.

Pre-conditions for testing

- Check the customer complaints.
(Check the operation of the automatic heater according to the operating instructions for the vehicle.)
- Coolant level O.K.
- Engine running and at normal operating temperature
- Electrical system (fuses, battery voltage) O.K.
- Control lever for temperature approximately in middle position
- Vehicle air distributor switch in middle position

The ignition must be switched off when disconnecting the plug connections.



Test step	Rotary switch setting	Testing of	Test instructions	Reading/Test specification	Coordinates
1	1	Power supply to control unit		10 ... 15	B 4
2	2	Passenger compartment temperature sensor		5 ... 11	B 6
2.1			Spray refrigerant spray into the passenger compartment temperature sensor	dropping while cooling off	B 8
3	8	Set value potentiometer for temperature	Shove the temperature control lever from stop to stop. The reading must change uniformly between min. and max. After testing, return the temperature control lever to the center position.	approx. 2 ... 8.5 Min.approx. 2 Max.approx. 9	B 10
4	12	Servomotor Mixing valve	Switch the auxiliary switch (S) on the test adapter on. Press the mini-button on adapter lead KDHK 0007. The servomotor closes the mixing valve as far as the stop. As soon as the mixing valve is pressed audibly against the stop, release the mini-button.	< 2	B 12
5	10	Servomotor Mixing valve potentiometer in the servomotor		< 2	B 17
5.1			Press the mini-button on adapter lead KDHK 0007. The servomotor opens the mixing valve as far as the stop. As soon as the mixing valve is pressed audibly against the stop, release the mini-button. Switch the auxiliary switch (S) on the test adapter off.	2 ... 8.5 slowly rising during adjustment	B 20

A3

Rapid diagnostic chart
Citroen CX

A4

Rapid diagnostic chart
Citroen CX


2. General introduction

Automatic heater

The electronic control unit regulates passenger compartment temperature.

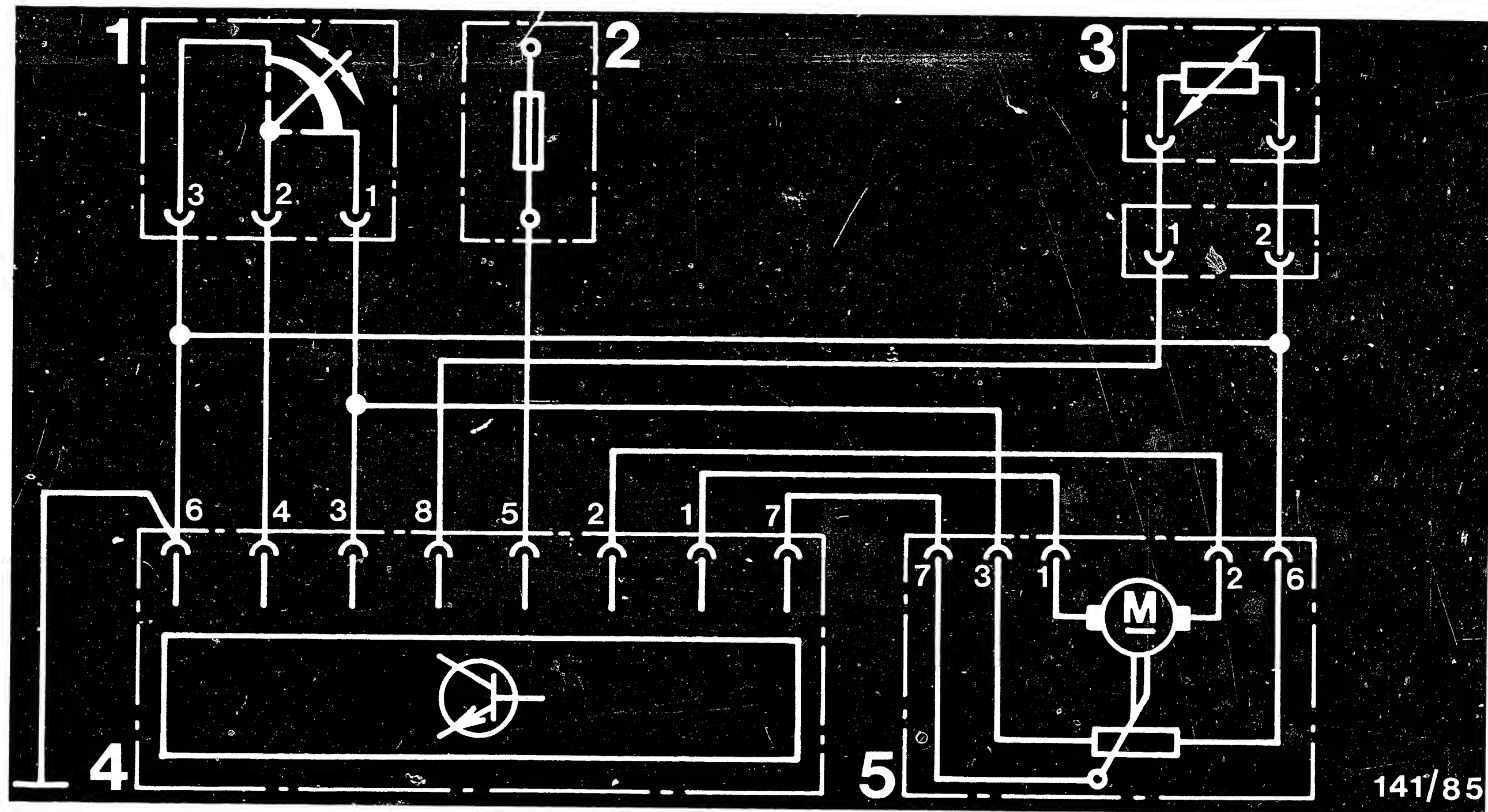
The set value set on the temperature selector is compared in the control unit with the actual value as measured by the passenger compartment temperature sensor.

Depending on how the temperature varies from the selected set temperature value, a servomotor adjusts the heater flap valve and thereby changes the air flow through the heat exchanger. The heater valve setting is reported back to the control unit by a potentiometer built into the servomotor. A delay circuit sometimes (depending upon the date of manufacture) built into the control unit effects a step-by-step adjustment of the heater flap when the value set for temperature on the temperature control is changed. The delay circuit is jumped when the ignition is switched on and the heater valve shifts immediately into the pre-selected setting.

Control unit with delay circuit	1 147 328 033
---------------------------------	---------------

Control unit without delay circuit	1 147 328 058
------------------------------------	---------------





1 = Temperature selector knob
 2 = Main fuse box
 3 = Passenger compartment temperature sensor

4 = Electronic control unit
 5 = Flap valve adjustment unit with electric motor

3. Wiring diagram, operating principle of automatic heater

A6

Wiring diagram automatic heater
 Citroen CX



A7

Wiring diagram automatic heater
 Citroen CX



4. Test equipment and tools

Test adapter for heater and air
conditioner

KDHK 0001

Adapter lead, automatic heater

KDHK 0007

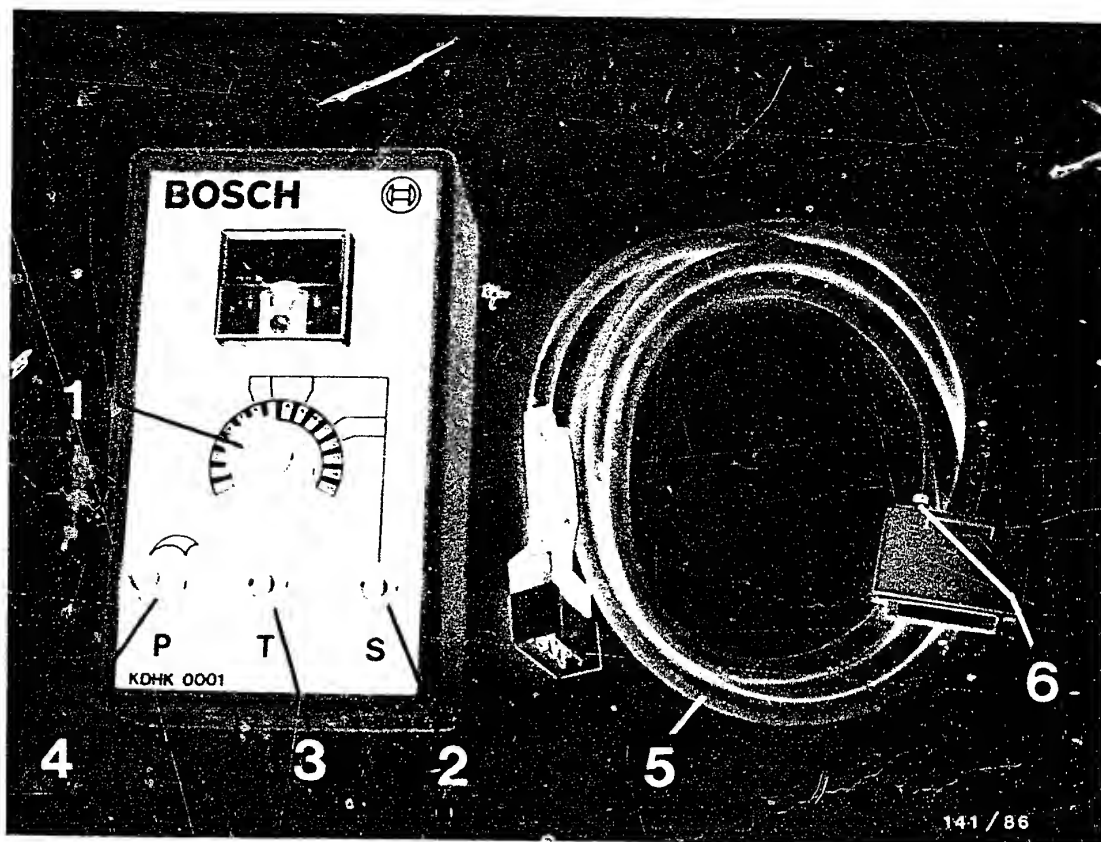
Multimeter ETE 014.00
or, e.g., Pontavi

0 684 101 400
commercially
available

Refrigerant spray

commercially
available





4.1 Test adapter for heater and air conditioner (KDHK 0001)

- 1 = Rotary switch (S1)
- 2 = Auxiliary switch (S)
- 3 = Button (T)
- 4 = Potentiometer (P)
- 5 = Adapter lead for automatic heater (KDHK 0007)
- 6 = Mini-button on adapter lead

Explanatory notes on the test adapter KDHK 0001 for the heater and air conditioner

The test adapter for the heater and the air conditioner is used to test the peripheral equipment on heating control and air conditioning equipment. The electronic control units are not tested with it.

Construction

The structure of the test adapter is such that the individual assemblies and the electrical leads are switched on and/or measured one after the other by means of a rotary switch (S1). Using the auxiliary switch (S), a given group of assemblies can be checked for two different functions.

The button (T) and the potentiometer (P) have no function in connection with the air- and heater control.

Use adapter lead KDHK 0007 for testing the system.

The operation of the mixing valve motor can be checked using the mini-button.

A10

Test adapter f.heater and air conditioner
Citroen CX



A11

Test adapter f.heater and air conditioner
Citroen CX



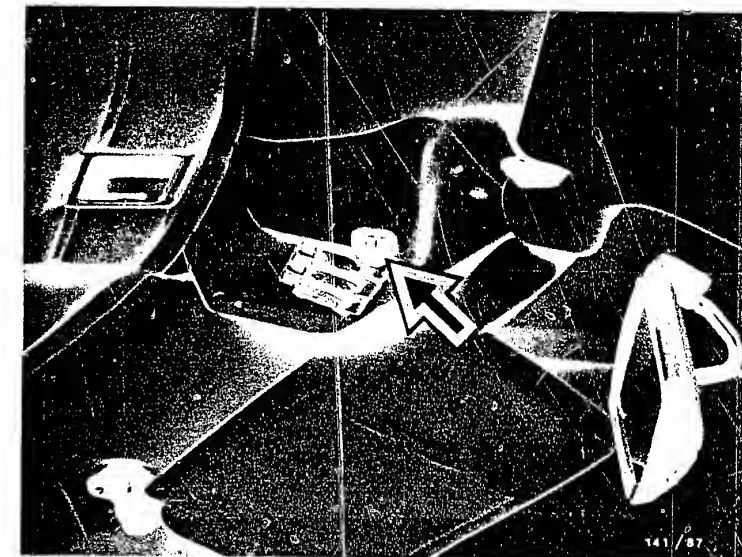
5. Installation position of the components

Passenger compartment temperature sensor

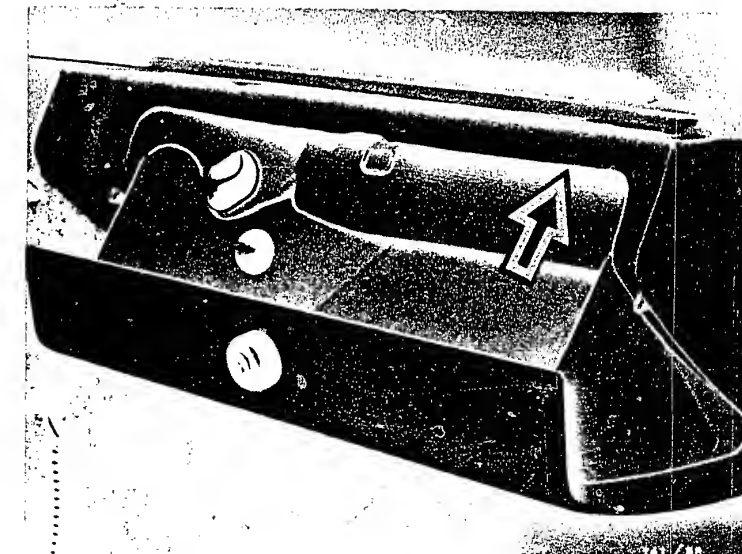
The passenger compartment temperature sensor is installed in the bracket in the roof area. (See the Figure at the top, arrow.)

To take it out and put it in, release the two fastening screws for the bracket (Figure at top) and take out the bracket.

The passenger compartment temperature sensor is clipped into the bracket from behind.



The connecting lead from the passenger compartment temperature sensor to the control unit is plugged in in addition in the glove compartment. (Figure at bottom, arrow.)



A12

Installation position of the components
Citroen CX

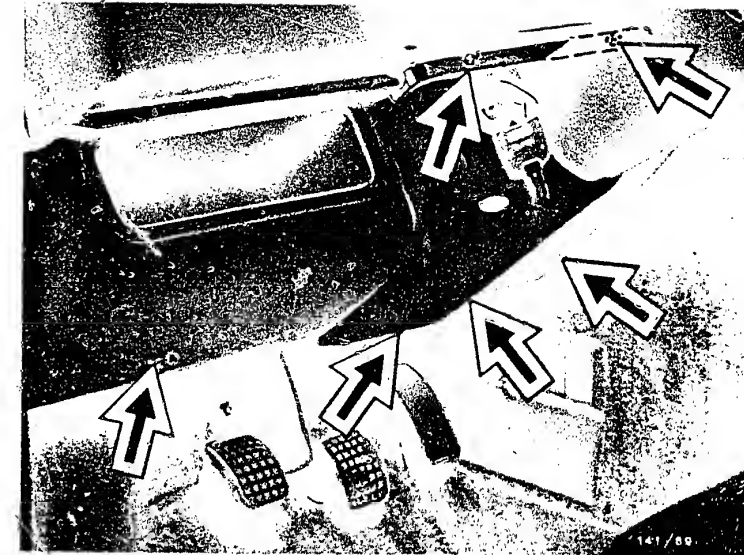


A13

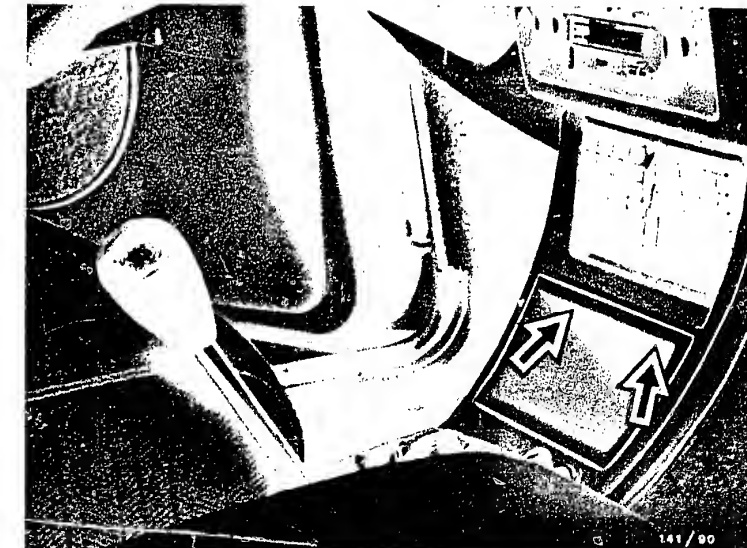
Installation position of the components
Citroen CX



The motor-driven valve adjustment unit
is attached at the heating box behind the panel in the footwell at the left.
To take out and put in the footwell panel, release the two fastening screws in the
engine compartment (one under the hydraulic oil reservoir) and the fastening screws
in the passenger compartment (Figure at top, arrows) and take the panel out.



The electronic control unit
is located in the center console behind the shelf insert. To take out, put in, and
check the system, remove the two fastening screws for the shelf insert (Figure at
bottom, arrows). Take out the insert. The control unit is then accessible.



A14

Installation position of the components
Citroen CX

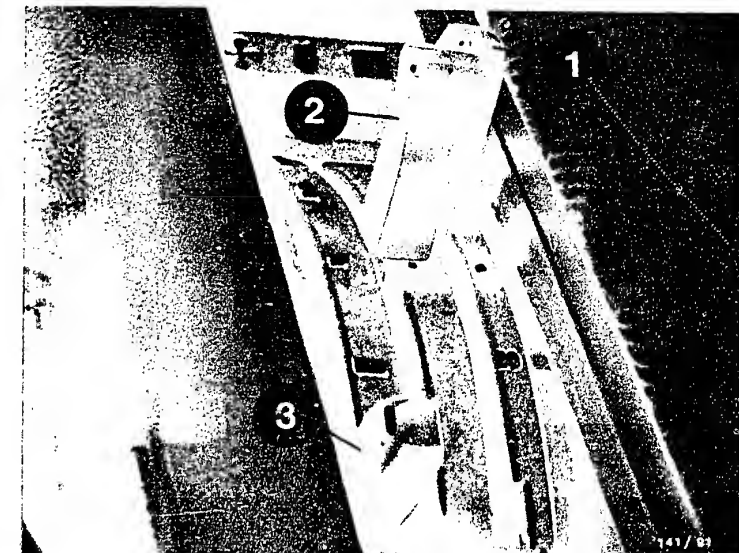


A15

Installation position of the components
Citroen CX



The temperature control lever (set value potentiometer, a non-Bosch product) is installed in the center console between the front seats. (See the Figure). To take it out or put it in, shove the surface of the front passenger's seat down somewhat, and release the fastening screws.



- 1=Temperature control lever
- 2=Air distributor lever
(head - foot area)
- 3=Air-flow control lever
(fan switch)

A16

Installation position of the components
Citroen CX



A17

Installation position of the components
Citroen CX



6. Trouble-shooting according to test steps

6.1 Pre-conditions

- Check the customer complaints.
(Check the operation of the automatic heater according to the operating instructions for the vehicle.)
- Coolant level O.K.
- Engine running and at normal operating temperature
- Electrical system (fuses, battery voltage) O.K.
- Temperature control lever approximately in middle position
- Vehicle air distributor switch in middle position

In the detailed trouble-shooting starting from Coordinates B 2 go through the test steps one after the other.

Proceed with the trouble-shooting listed under the test steps only if a malfunction is indicated.



6.2 Connecting the adapter lead

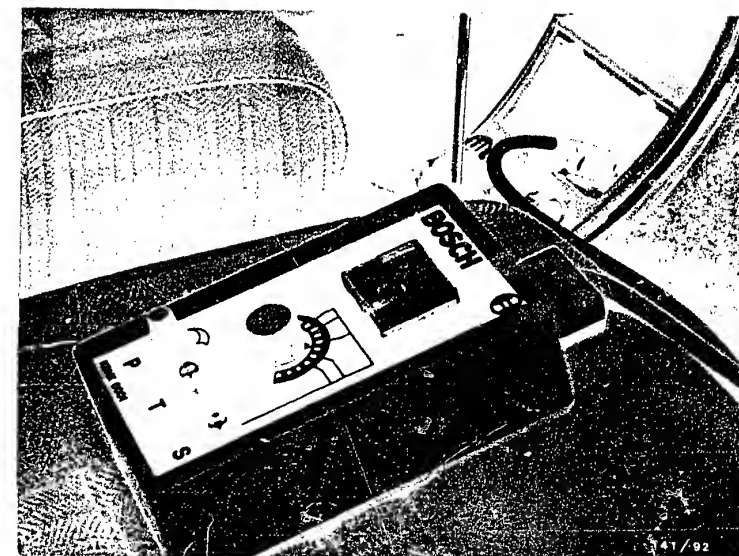
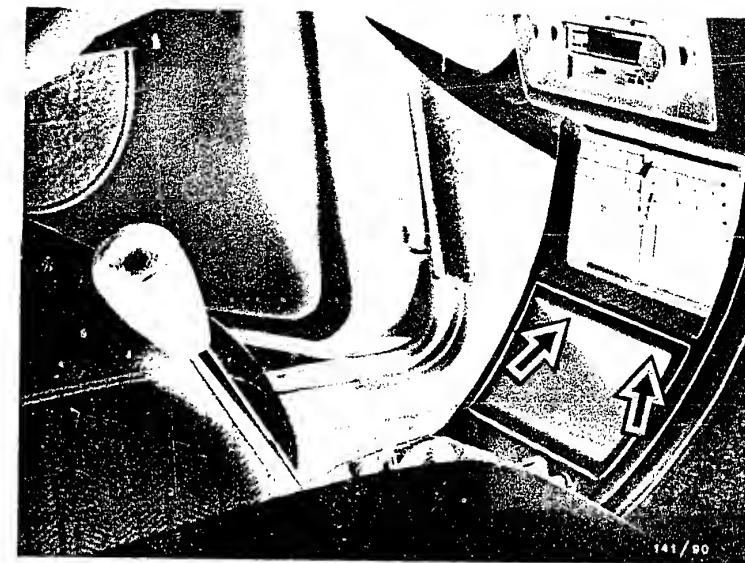
Switch the ignition off, remove the shelf insert from the center console. To do this, release the 2 screws (see the Figure at the top, arrows), and pull out the shelf insert.

Disconnect the control unit plug from the electrical control unit and using adapter lead KDHK 0007, connect it to test adapter KDHK 0001. (See the Figure at the bottom). Start the engine.

Note:

Do trouble-shooting using the test chart.

If the connection from the control unit plug to the adapter lead or from the adapter lead to the test adapter is taken apart, set the rotary switch on the test adapter to "0" beforehand in every case, and switch the ignition off.

**B2**

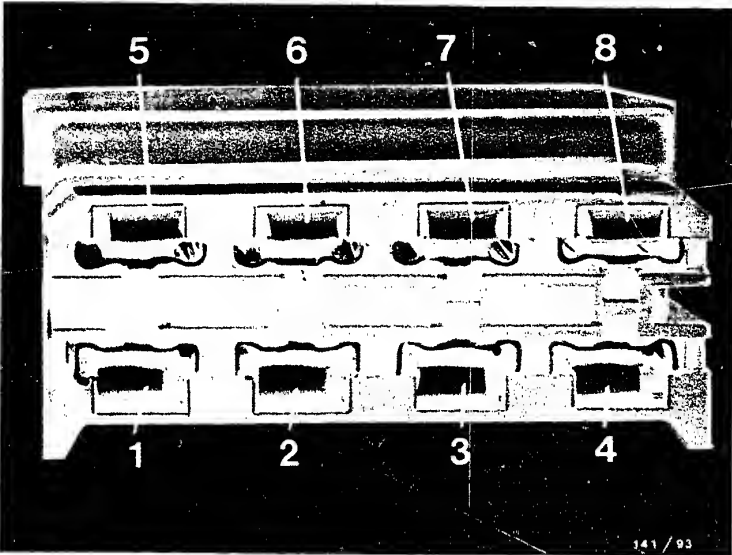
Trouble-shooting
Citroen CX

**B3**

Trouble-shooting
Citroen CX



Test step: 1			
Operation		Reading	Test procedure
<u>Rotary switch setting (S1)</u>	1	on test adapter 10 ... 15	<u>Component:</u> Power supply to electronic control unit, heater control
<u>Test equipment:</u>			
Test adapter			
<u>Scale:</u> 0 ... 15			<u>Operation:</u> Check the power supply
<u>Operation in vehicle:</u> Engine runs			<u>Malfunction:</u> If reading is less than 10 or greater than 15
<u>Additional operation</u>			



Control unit plug

Trouble-shooting with the multimeter:

Using a voltmeter test from the control unit plug socket 6 to + Term. 30 and from socket 5 to ground.
Specified reading: approx. battery voltage.
Eliminate contact resistances at plug connections.
If the reading is greater than battery voltage, the alternator regulator is defective.

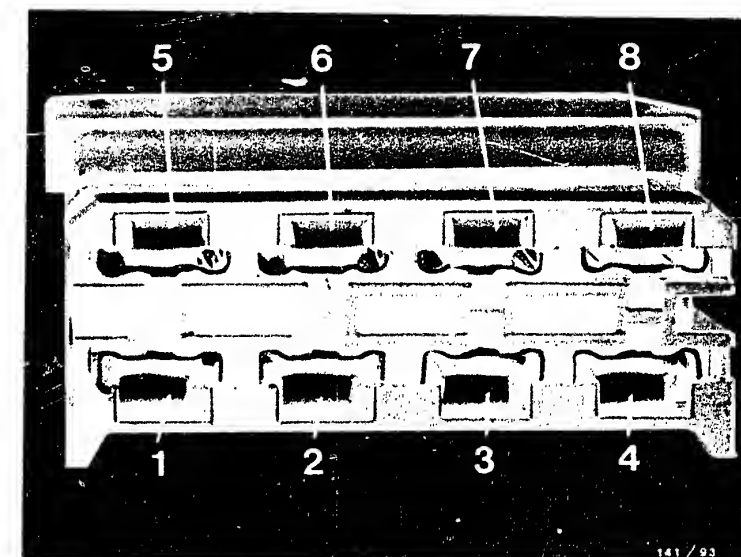
<u>Test step: 2.1</u>			
Operation		Reading	Test procedure
<u>Rotary switch setting (S1)</u>	2	on test adapter	<u>Component:</u>
<u>Test equipment:</u> Test adapter		Reading drops while cooling off	Passenger compartment temperature sensor
<u>Scale:</u> 0 ... 15			<u>Operation:</u> Change in resistance
<u>Operation in vehicle:</u> Engine is running			<u>Malfunction:</u> Not dropping during cooling off
<u>Additional operation</u> Spray refrigerant spray into the sensor			

Trouble-shooting with the multimeter:

Switch the ignition off. Check the resistance of the passenger compartment temperature sensor between the plug pins. Specified reading: approx. 8 ... 16 k Ω at a temperature of approx. 15 - 30°C on the temperature sensor.

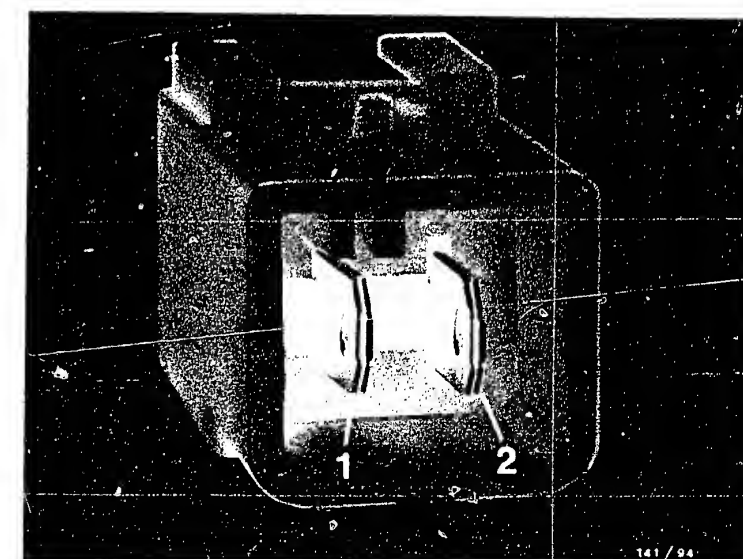
Spray the passenger compartment temperature sensor with refrigerant spray. The resistance must increase. If so, the passenger compartment temperature sensor is O.K. Using an ohmmeter, check the following leads for continuity. (Specified reading: approx. 0 Ω):

From the control unit plug socket 8 to the temperature sensor plug socket 1, from the control unit plug socket 6 to the temperature sensor plug socket 2. Check the leads for short circuit: connect an ohmmeter between socket 6 and socket 8 on the control unit plug. Specified reading: ∞ Ω . (The passenger compartment temperature sensor plug is disconnected for this.)



Control unit plug

Plug for passenger compartment temperature sensor



B8

Trouble-shooting
Citroen CX



B9

Trouble-shooting
Citroen CX



Test step: 3		Reading	Test procedure
Operation			
Rotary switch setting (S1)	8	on test adapter approx. 1.5...8.5	<u>Component:</u> Temperature set value potentiometer (non-Bosch product)
<u>Test equipment:</u> Test adapter		Min. approx. 1 Max. approx. 9	<u>Operation:</u> Change in resistance
<u>Scale:</u> 0 ... 15		The reading must change evenly between "min." and "max."	
<u>Operation in vehicle:</u> Engine running		After testing, return the <u>temperature control lever to the middle position.</u>	<u>Malfunction:</u> Reading jumps or no reading
<u>Additional operation</u> Move the temperature control lever from min. to max.			

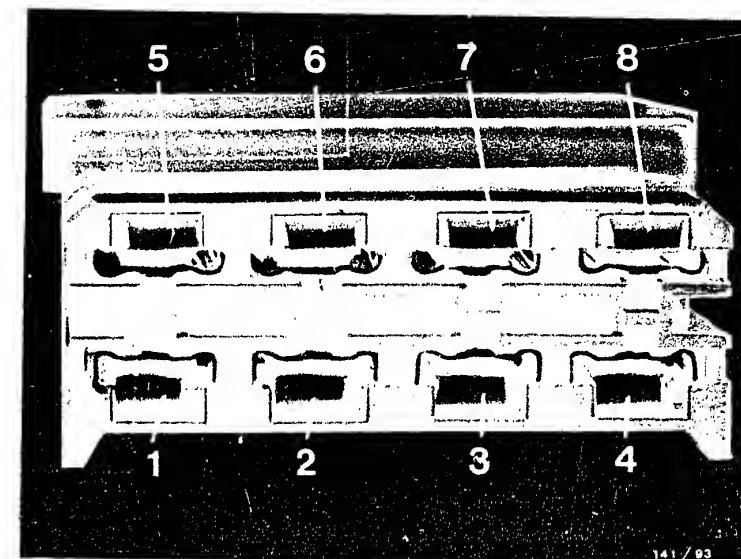
Trouble-shooting:

If the reading jumps between the stops "Min." and "Max.", the set value potentiometer for temperature is defective. Take it out and replace it.

If there is no reading, check the lead from the control unit plug socket 4 to the set value potentiometer for temperature socket 2 for short circuit or break.

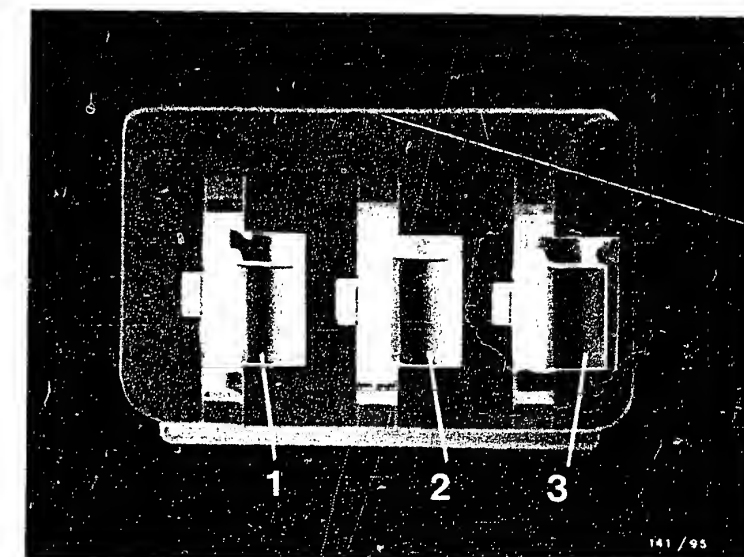
Using an ohmmeter directly on the plug, measure the set point potentiometer for temperature socket 1 to socket 3.

Specified reading: < 15 kΩ



Control unit plug

Plug on the set value potentiometer for temperature



B 10

Trouble-shooting
Citroen CX

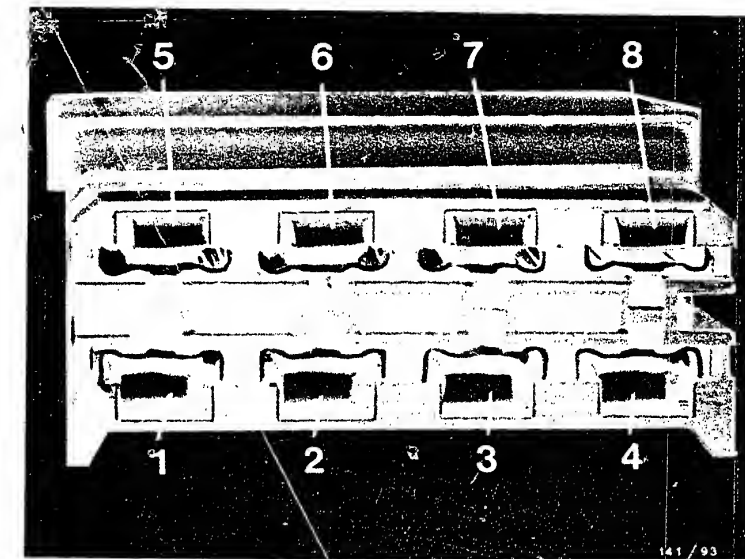


B 11

Trouble-shooting
Citroen CX

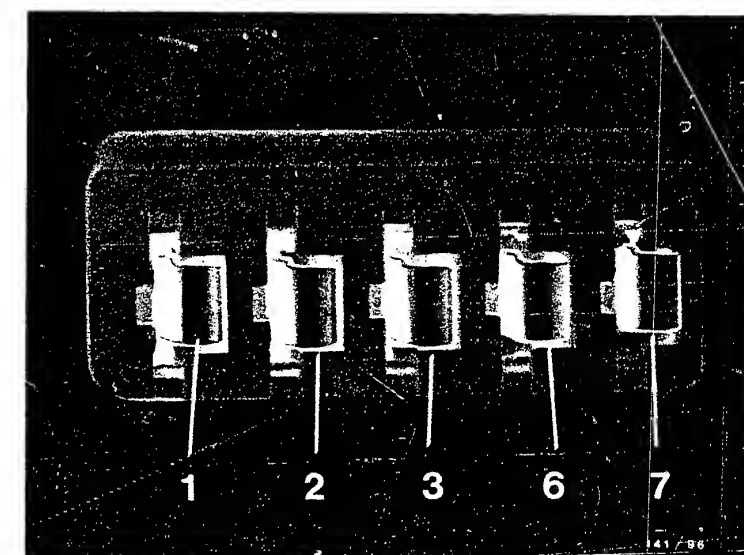


Test step: 4			
Operation		Reading	Test procedure
Rotary switch setting (S1)	12	on the test adapter < 2 Determine by listening to it, whether the servomotor is running. Determine by feeling that the heating effect is dropping off.	<u>Component:</u> Valve control unit servo-motor
Test equipment:			<u>Operation:</u> Warm air inlet is closed by the mixing valve.
Test adapter			
Scale:			<u>Malfunction:</u> Servomotor is not running. Mixing valve does not close.
0 ... 15			
Operation in vehicle:			
Engine running			
Additional operation			
Switch auxiliary switch "S" on the test adapter on. Press the mini-button on the adapter lead. When the mixing valve is against the stop, release the mini-button.			



Control unit plug

Plug for the motor-driven valve control unit



Trouble-shooting with the multimeter:

Switch the ignition off. Disconnect the control unit plug from the adapter lead. Using an ohmmeter, check the lead from the control unit plug socket 1 to the motor-driven valve adjustment unit plug socket 1 and from the control unit plug socket 2 to the motor-driven valve control unit plug socket 2.

Specified reading: approx. 0 Ω

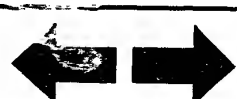
With an ohmmeter directly on the plug, check the motor-driven valve control unit socket 1 to socket 2.

Specified reading: 120 ... 150 Ω

Continued on B14/B15

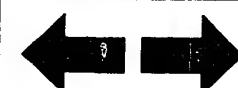
B12

Trouble-shooting
Citroen CX



B13

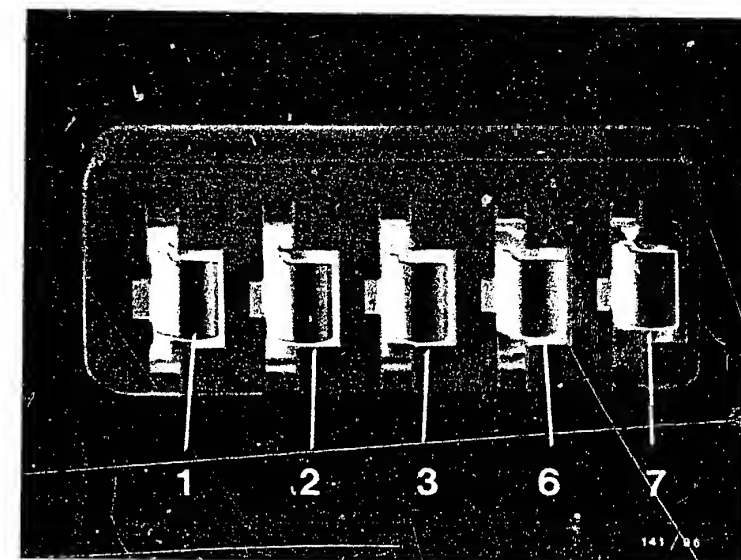
Trouble-shooting
Citroen CX



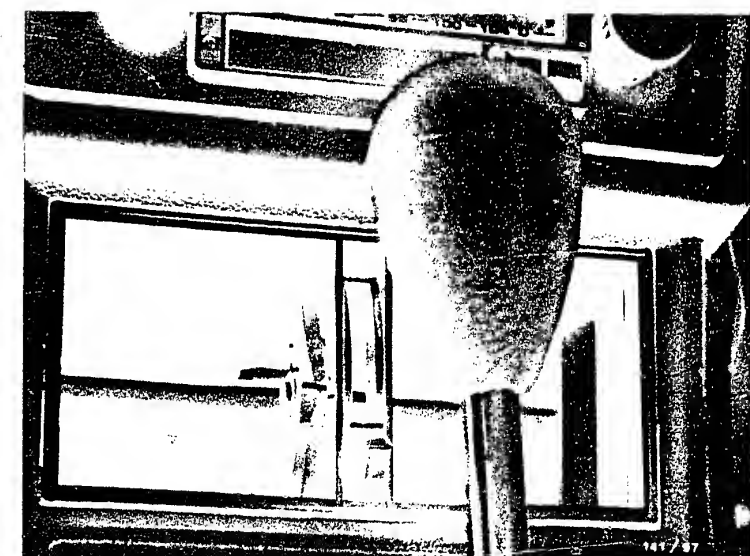
Trouble-shooting, test step 4 (continued)

Using a voltmeter, measure from the motor-drive valve control unit plug socket 2 (Figure at top) to ground (rotary switch S 1 on the test adapter for the heater and air conditioner in setting 12, auxiliary switch switched on, mini-button pressed).
Specified reading: approx. V_B

If the motor-driven valve control unit is O.K. electrically, take out the air inlet nozzles (see Figure at bottom) and check that the mixing valve is being driven.
If the motor-driven mixing valve is not being driven, take out the valve control unit and check the connection between the mixing valve and the servomotor.



Motor-driven valve control unit plug



Continued on B16/B17

B 14

Trouble-shooting
Citroen CX



B 15

Trouble-shooting
Citroen CX



Trouble-shooting, test step 4 (continued)

Take out and replace the motor-driven valve control unit.

Release 3 fastening screws.

Remove the safety lock on the connecting shaft between the adjusting motor and the mixing valve. When putting in, set the set value control to the position "cold". To do this, disconnect the plug from the passenger compartment temperature sensor and short-circuit both connections.

Connect the plug for the motor-driven valve control unit and switch the ignition on. (Control unit connected.) The adjustment motor runs to the setting "cold".

Press the mixing valve by hand into the setting "cold". (Hot air inlet closed.)

Insert the adjusting motor and the connecting shaft into the mixing valve.

Put in the safety lock on the connecting shaft at a distance of approx. 75 mm from the adjusting motor sleeve.

Note:

If the motor has been operated while out of the vehicle, the motor potentiometer must be readjusted.

Run the motor in the position as shown in the Figure at the bottom.

Connect a voltage source of 13.0 V to the plug for the motor-driven valve control unit. (+ to Term. 3, - to Term. 2).

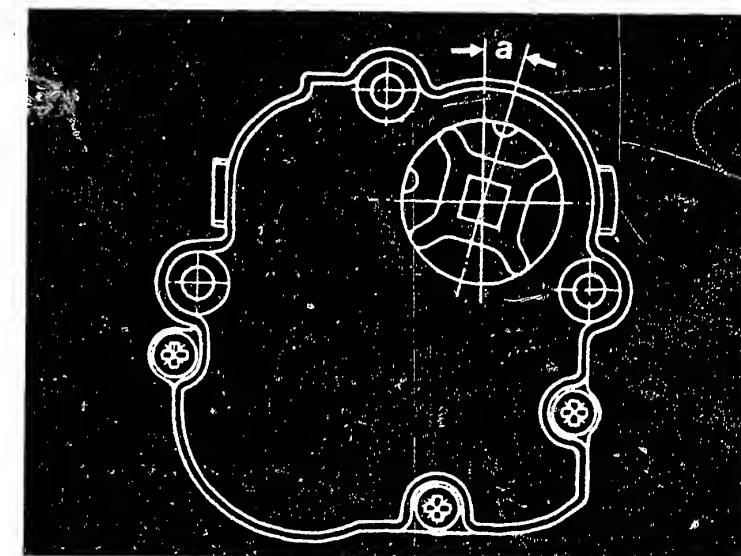
Connect a voltmeter between the plug for the motor-driven valve control unit Term. 1 and ground.

Using the potentiometer control shaft (see the arrow in the Figure at the top, the stud with the smaller diameter), set a voltage of 4.37 ... 4.76 V.



Motor-driven valve control unit

View of the drive-end
Setting angle $a = 3^\circ \pm 1^\circ$



B 16

Trouble-shooting
Citroen CX



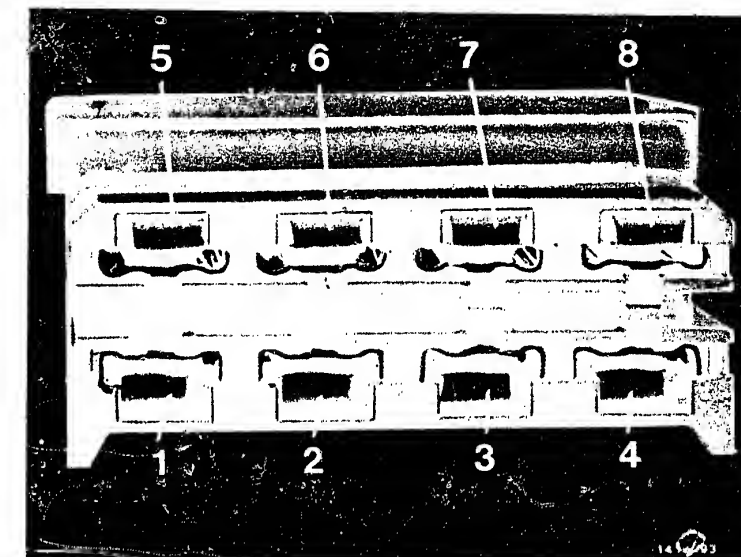
B 17

Trouble-shooting
Citroen CX



Test step: 5 Testing to follow directly after test step 4!

Operation		Reading	Test procedure
Rotary switch setting (S1)	10	on the test adapter < 2	<u>Component:</u> Potentiometer in the servomotor
<u>Test equipment:</u> Test adapter			<u>Operation:</u> Resistance of the potentiometer at the lower stop.
<u>Scale:</u> 0 ... 15			<u>Malfunction:</u> Reading not < 2
<u>Operation in vehicle:</u> Engine running			
<u>Additional operation</u>			



Control unit plug

Trouble-shooting with the multimeter:

Switch the ignition off.

Disconnect the control unit plug from the adapter lead.

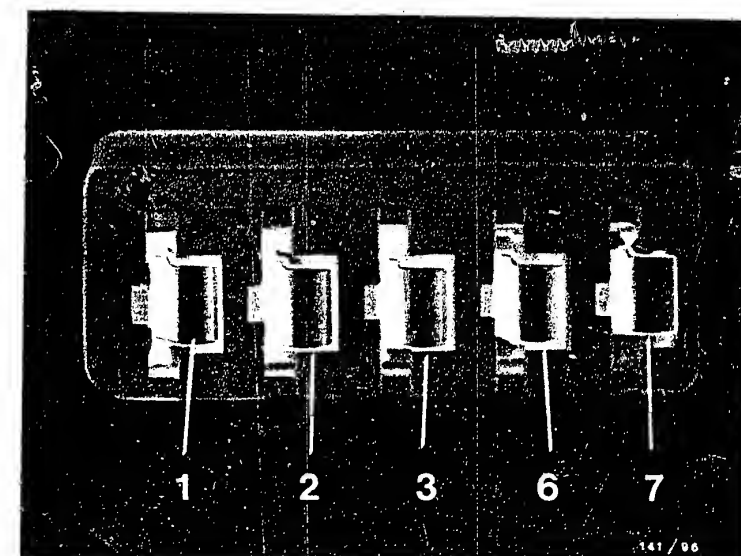
With an ohmmeter, test from the control unit plug socket 3 to the motor-driven valve control unit plug socket 3, from the control unit plug socket 7 to the motor-driven valve control unit plug socket 7, and from the control unit plug socket 6 to the motor-driven valve control unit plug socket 6.

Specified reading: approx. 0 Ω .

With an ohmmeter directly on the motor-driven valve control unit plug, test socket 6 to socket 3.

Specified reading: 8 ... 15 k Ω

Plug for the motor-driven valve control unit



Continued on B20/B21

B 18

Trouble-shooting
Citroen CX



B 19

Trouble-shooting
Citroen CX



Trouble-shooting, test step 5 (continued)

Take out and replace the motor-driven valve control unit.

Release 3 fastening screws.

Remove the safety lock on the connecting shaft between the adjusting motor and the mixing valve. When putting in, set the set value control to the position "cold".

To do this, disconnect the plug from the passenger compartment temperature sensor and short-circuit both connections.

Connect the plug for the motor-driven valve control unit and switch the ignition on. (Control unit connected.) The adjustment motor runs to the setting "cold".

Press the mixing valve by hand into the setting "cold". (Hot air inlet closed.)

Insert the adjusting motor and the connecting shaft into the mixing valve.

Put in the safety lock on the connecting shaft at a distance of approx. 75 mm from the adjusting motor sleeve.

Note:

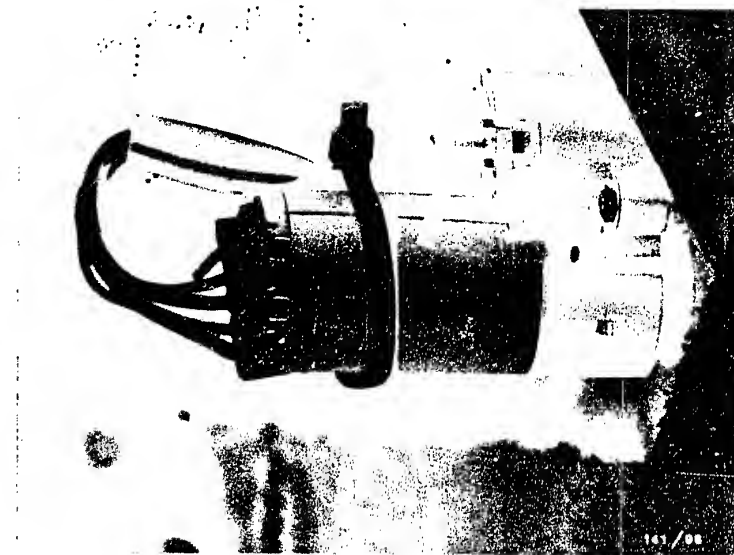
If the motor has been operated while out of the vehicle, the motor potentiometer must be readjusted.

Run the motor in the position as shown in the Figure at the bottom.

Connect a voltage source of 13.0 V to the plug for the motor-driven valve control unit. (+ to Term. 3, - to Term. 2).

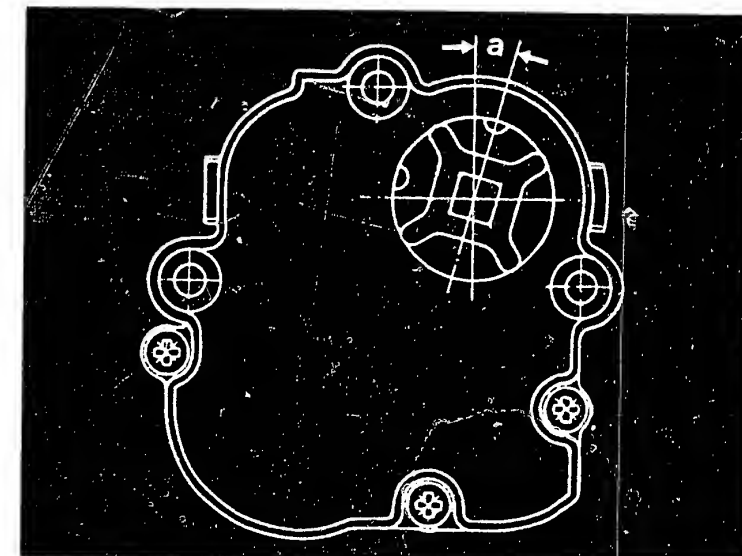
Connect a voltmeter between the plug for the motor-driven valve control unit Term. 1 and ground.

Using the potentiometer control shaft (see the arrow in the Figure at the top, the stud with the smaller diameter), set a voltage of 4.37 ... 4.76 V.



Motor-driven valve control unit

View of the drive-end
Setting angle $a = 3^\circ \pm 1^\circ$



B20

Trouble-shooting
Citroen CX

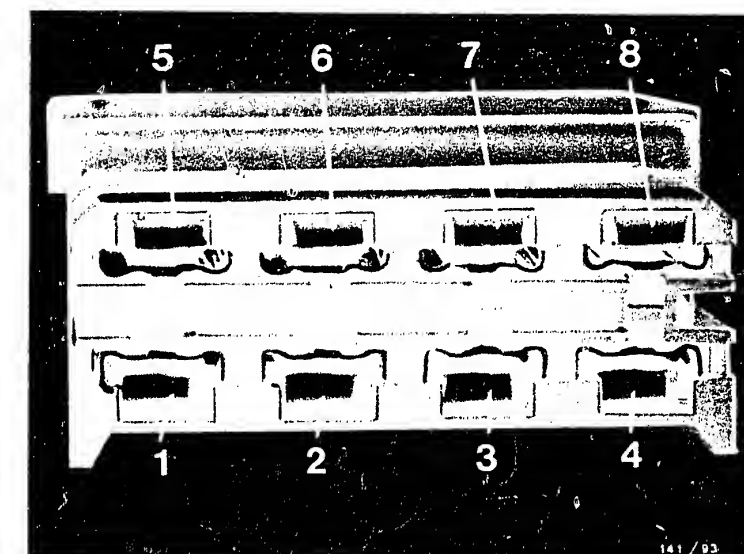


B21

Trouble-shooting
Citroen CX

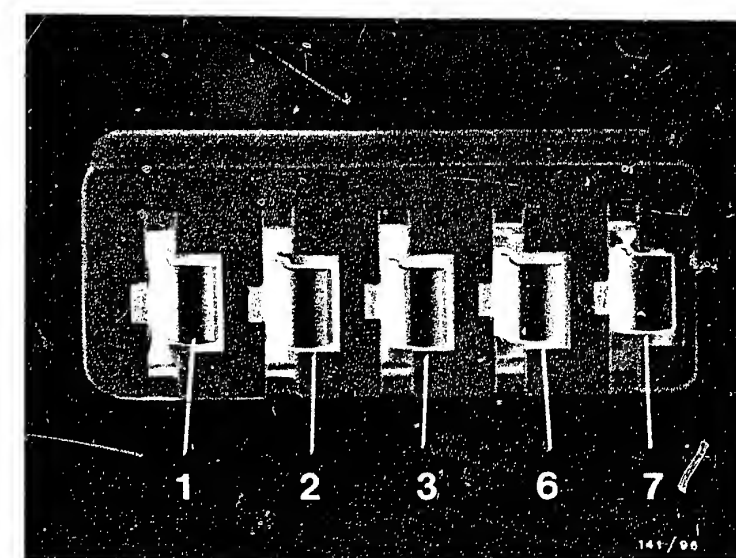


Test step: 5.1			
Operation		Reading	Test procedure
Rotary switch setting (S1)	10	on the test adapter slowly rising 1.5 ... 8.5	Component: Potentiometer in the servo-motor
Test equipment:		Min. 1 Max. 9	Operation: Change in resistance
Test adapter			
Scale:			
0 ... 15		(find out by feeling whether there is a heating effect present)	Malfunction: Reading does not rise
Operation in vehicle:			
Engine running			
Additional operation			
Switch auxiliary switch (S) on the test adapter on. Press the mini-button on the adapter lead. When the mixing valve is at the stop, release the mini-button.			



Control unit plug

Motor-driven valve control unit plug



Trouble-shooting with the multimeter:

Switch the ignition off.

Disconnect the control unit plug from the adapter lead.

Using an ohmmeter, check from the control unit plug socket 3 to the motor-driven valve control unit plug socket 3, from the control unit plug socket 7 to the motor-driven valve control unit plug socket 7, and from the control unit plug socket 6 to the motor-driven valve control unit plug socket 6.

Specified reading: approx. 0 Ω .

Using an ohmmeter directly on the motor-driven valve control unit plug, test socket 6 to socket 3.

Specified reading: < 15 k Ω

Continued on C1/C2

B22

Trouble-shooting
Citroen CX



B23

Trouble-shooting
Citroen CX



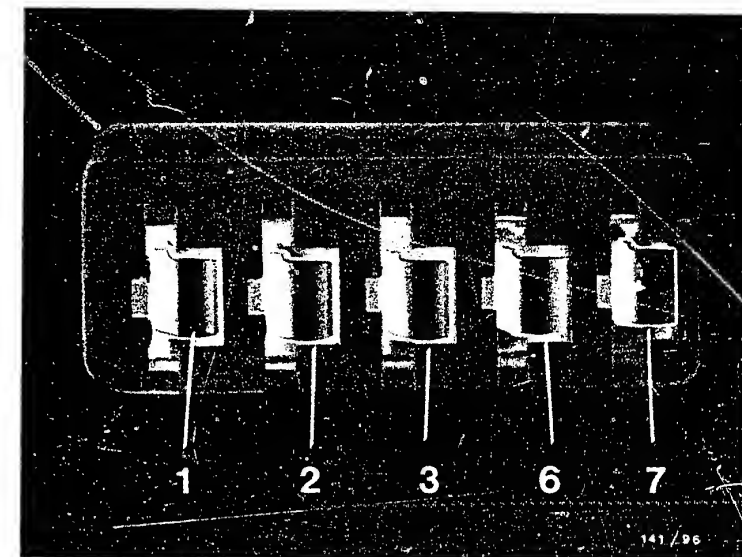
Trouble-shooting, test step 5.1 (continued)

Using a voltmeter, measure from the motor-driven valve control unit plug socket (Figure at top) to ground (test adapter for heater and air conditioner connected, rotary switch S 1 in setting 10, auxiliary switch S switched on, mini-button pressed, ignition switched on).

Specified reading: approx. V_B

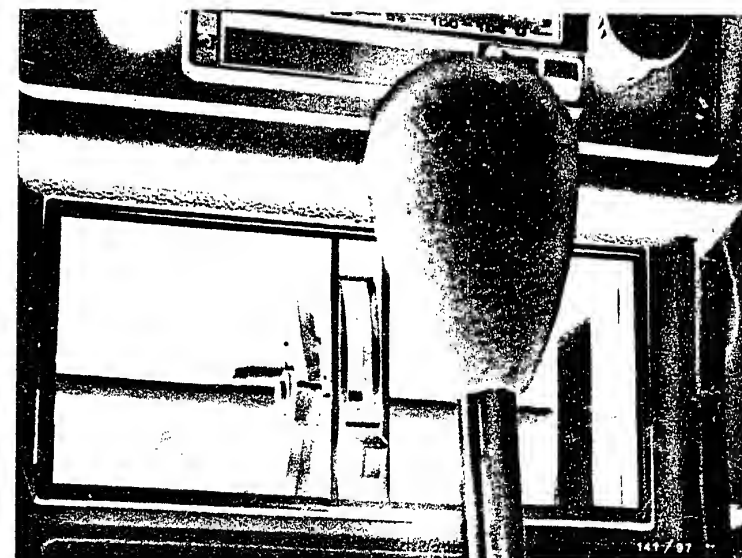
If the motor-driven valve control unit is electrically O.K., take out the air inlet nozzles (Figure at bottom) and check whether the mixing valve is being driven.

If the mixing valve is not being driven, take out the motor-driven valve control unit and check the connection between the mixing valve and the servomotor.



Motor-driven valve control unit plug

Continued on C3/C4



C1

Trouble-shooting
Citroen CX



C2

Trouble-shooting
Citroen CX



Trouble-shooting, test step 5.1 (continued)

Take out and replace the motor-driven valve control unit.

Release 3 fastening screws.

Remove the safety lock on the connecting shaft between the adjusting motor and the mixing valve. When putting in, set the set value control to the position "cold".

To do this, disconnect the plug from the passenger compartment temperature sensor and short-circuit both connections.

Connect the plug for the motor-driven valve control unit and switch the ignition on. (Control unit connected.) The adjustment motor runs to the setting "cold".

Press the mixing valve by hand into the setting "cold". (Hot air inlet closed.)

Insert the adjusting motor and the connecting shaft into the mixing valve.

Put in the safety lock on the connecting shaft at a distance of approx. 75 mm from the adjusting motor sleeve.

Note:

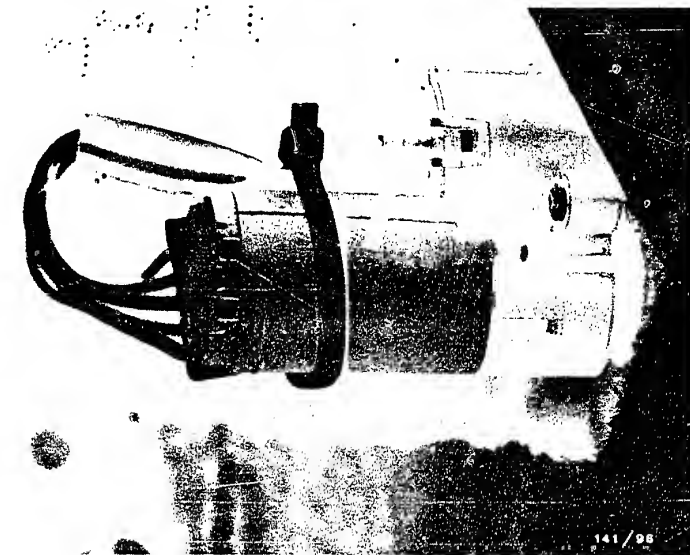
If the motor has been operated while out of the vehicle, the motor potentiometer must be readjusted.

Run the motor in the position as shown in the Figure at the bottom.

Connect a voltage source of 13.0 V to the plug for the motor-driven valve control unit. (+ to Term. 3, - to Term. 2).

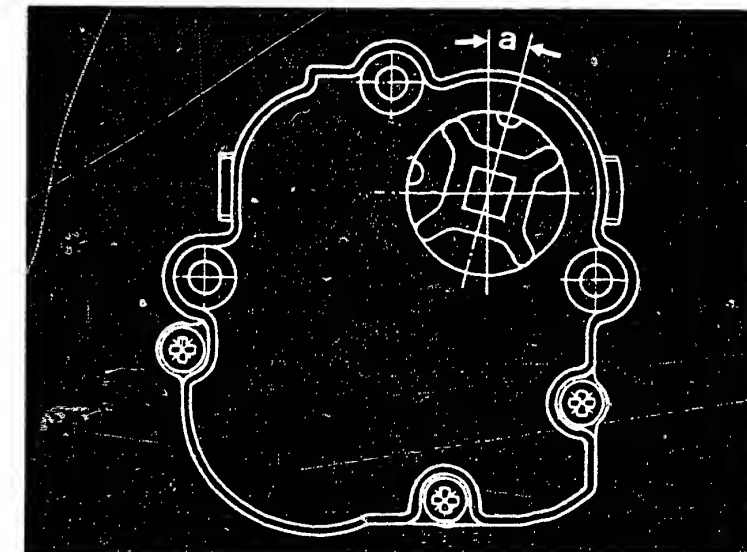
Connect a voltmeter between the plug for the motor-driven valve control unit Term. 1 and ground.

Using the potentiometer control shaft (see the arrow in the Figure at the top, the stud with the smaller diameter), set a voltage of 4.37 ... 4.76 V.



Motor-driven valve control unit

View of the drive-end
Setting angle $a = 3^\circ \pm 1^\circ$



C3

Trouble-shooting
Citroen CX



C4

Trouble-shooting
Citroen CX



Set the rotary switch (S1) on the test adapter at "0".
Switch the ignition off.

Disconnect adapter lead KDHK 0007 from the control unit plug.

If no defect has been found on the individual components when testing the automatic heating system with the test adapter, but there is still a malfunction present on the automatic heating system, take out and replace the electronic control unit as an experiment. Plug the control unit plug on the electronic control unit. Then recheck the system according to the operating instructions for the vehicle. Then put the footwell panelling on the left and the shelf insert back in.



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